SOLAR LIGHT

Spectral Transmission Testing of Ticker Topical Dispenser from **BIOSRX Inc.**

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CUSTOMER INFORMATION:

BIOSRX, INC.

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PREPARED BY:

Drew Hmiel, *Materials Scientist /Physicist at Solar Light*

OBJECTIVE:

To measure the customer supplied material's UV transmission from 250 nm to 450 nm.

The sample is a type of metered topical dispenser; with and without a paper label for pharmaceutical product.

EXECUTIVE SUMMARY:

Some UV-A, visible and a small amount of UV-B transmission was measured for the Ticker 37 Dispenser, through the wall with no label.

No UV-B, UV-A or Visible was measured through the Ticker 37 Dispenser, through the wall with the label.

TEST AND MEASUREMENT EQUIPMENT:

LabSphere UV1000F Transmittance Analyzer SN 4267

TEST SITE:

100 East Glenside Avenue, Glenside, PA 19038 USA

TEST SETUP:

- The transmission test samples were prepared by removing any caps and sawn with a DREMEL cutoff wheel to separate the wall of the tube from the dispenser Figures 1, 2 and 3.

Measurement performed by:
Drew Hmiel

- The Test Protocol is adapted from ASTM E903 specification: "Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres".

- This test method is applicable to materials having both specular and or diffuse optical properties.

- Measurements of spectral near normal conical-hemispherical transmission (or reflectance) are made over the spectral range from 250 nm to 450 nm, index of 1 nm with an integrating sphere spectrophotometer having a small conical solid angle of incident flux on a sample.

- The laboratory was at 20±3°C during the test.

- First, a blank scan with no product was averaged for four scans.

- Each sample was placed in the analyzer and was scanned at four different places, and positions.

- The ratio of the irradiance with and without the sample is the spectral transmittance of that sample.

FIGURE 1   **FIGURE 2**   **FIGURE 3**

RESULTS:

- No UV-B, UV-A or Visible was measured though the Ticker 37 Dispenser, through the wall with the label. Shown in Fig. 4

- A small fraction of UV-A transmission, some visible and a small amount of UV-B was measured for the Ticker 37 Dispenser through the wall with no label. Shown in Fig. 5

Table 1a and 1b are compilations of the individual scans of each sample, showing the percentage transmission for each wavelength range.

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Table 1a—Dispenser with Label

	UVB % Transmission (250-320 nm)	UVA % Transmission (320-400 nm)	UVA + B % Transmission (250-400 nm)	400-450 nm % Transmission
Scan 1	0.04	0.03	0.07	0.09
Scan 2	0.03	0.02	0.05	0.09
Scan 3	0.02	0.00	0.02	0.03
Scan 4	0.05	0.03	0.07	0.10
Average	0.03	0.02	0.05	0.08

Table 1b—Dispenser Wall

	UVB % Transmission (250-320 nm)	UVA % Transmission (320-400 nm)	UVA + B % Transmission (250-400 nm)	400-450 nm % Transmission
Scan 1	0.59	0.82	1.41	1.99
Scan 2	0.58	0.72	1.30	1.76
Scan 3	0.47	0.67	1.14	1.68
Scan 4	0.51	0.82	1.33	2.02
Average	0.54	0.76	1.29	1.86

Absorbance = - log10(Transmittance) = $-\log_{10}(E_{avg}/E_0)$ where E_{avg} is the average irradiance measured through the sample, and E_0 is the blank irradiance.

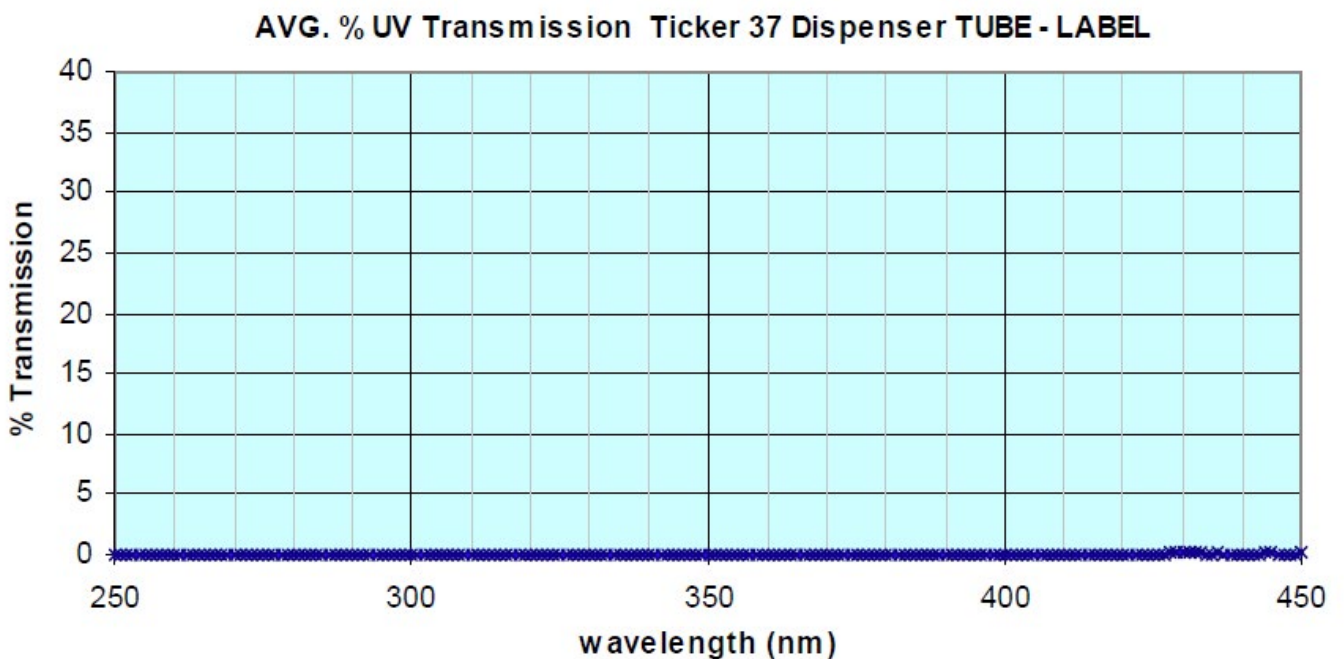*Figure 4—Average % Transmission of Dispenser with Label*

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Figure 5—Average % Transmission of Dispenser Wall
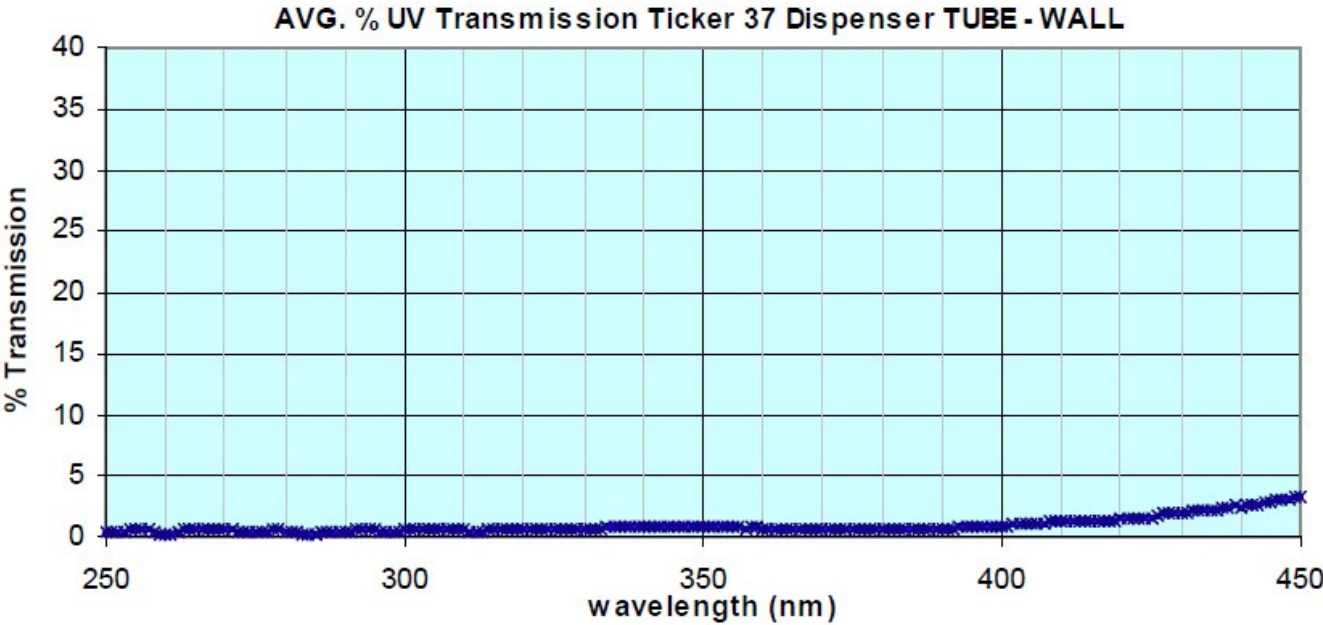
Figure 6—All Scans % Transmission of Dispenser with Label

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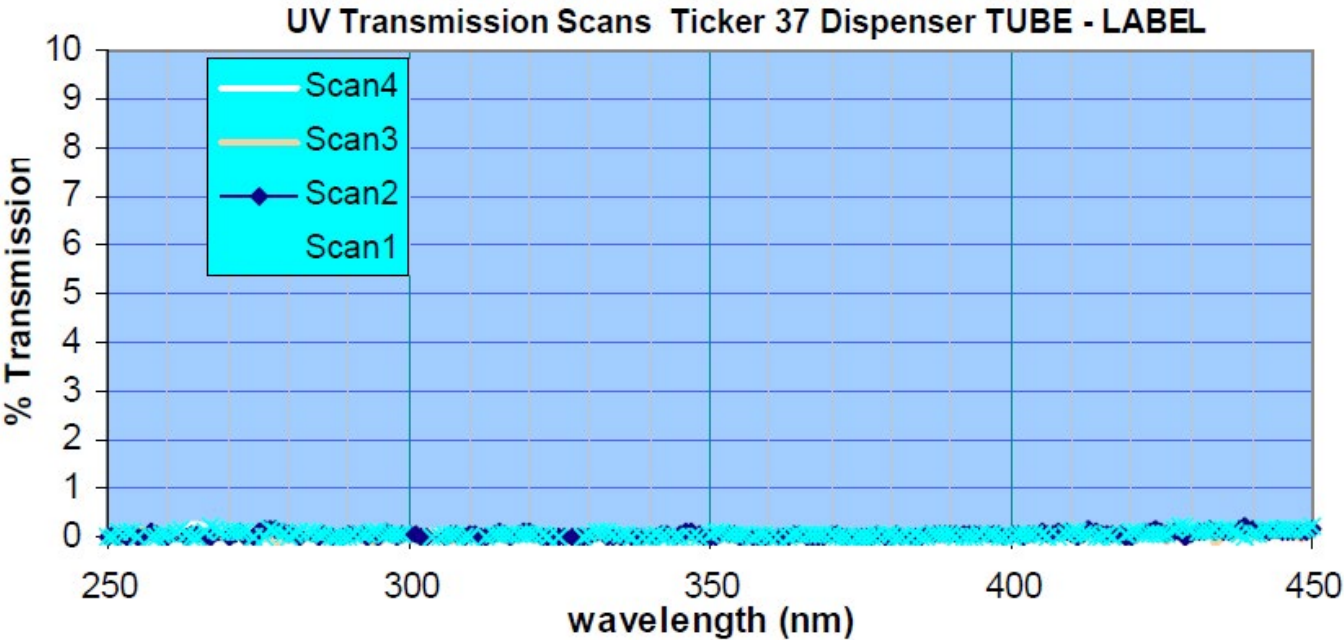
Figure 7—All Scans % Transmission of Dispenser Wall

UV Transmission Scans Ticker 37 Dispenser TUBE - WALL
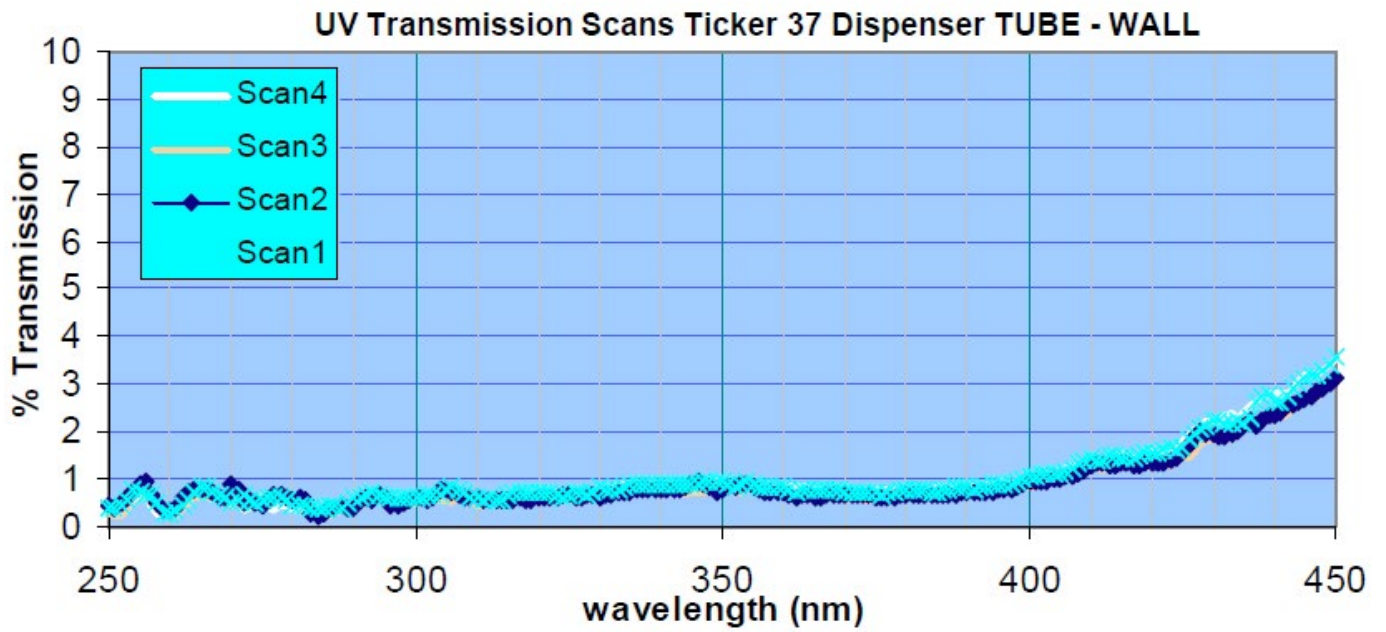
Figure 8 — Average UV Absorbance of Dispenser with Label

UV Absorbance Ticker 37 Dispenser - LABEL

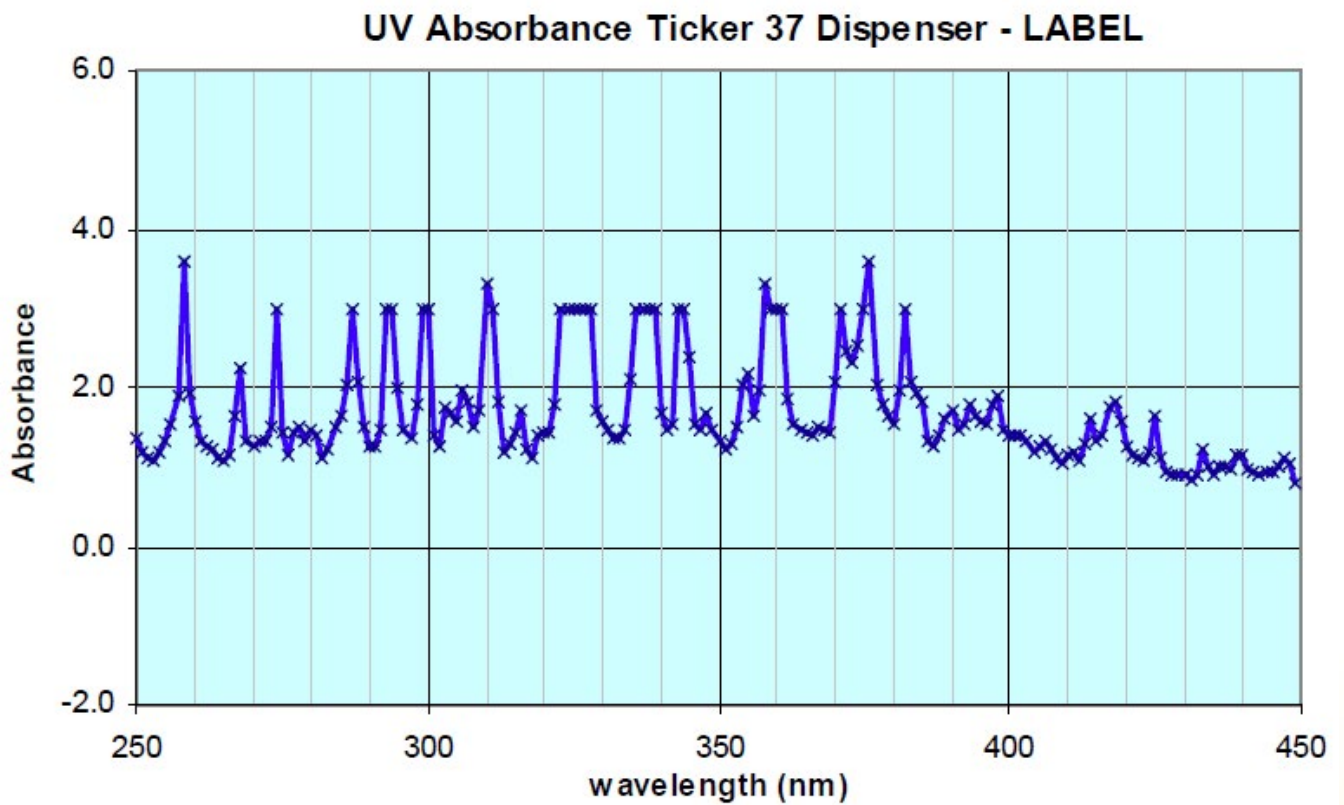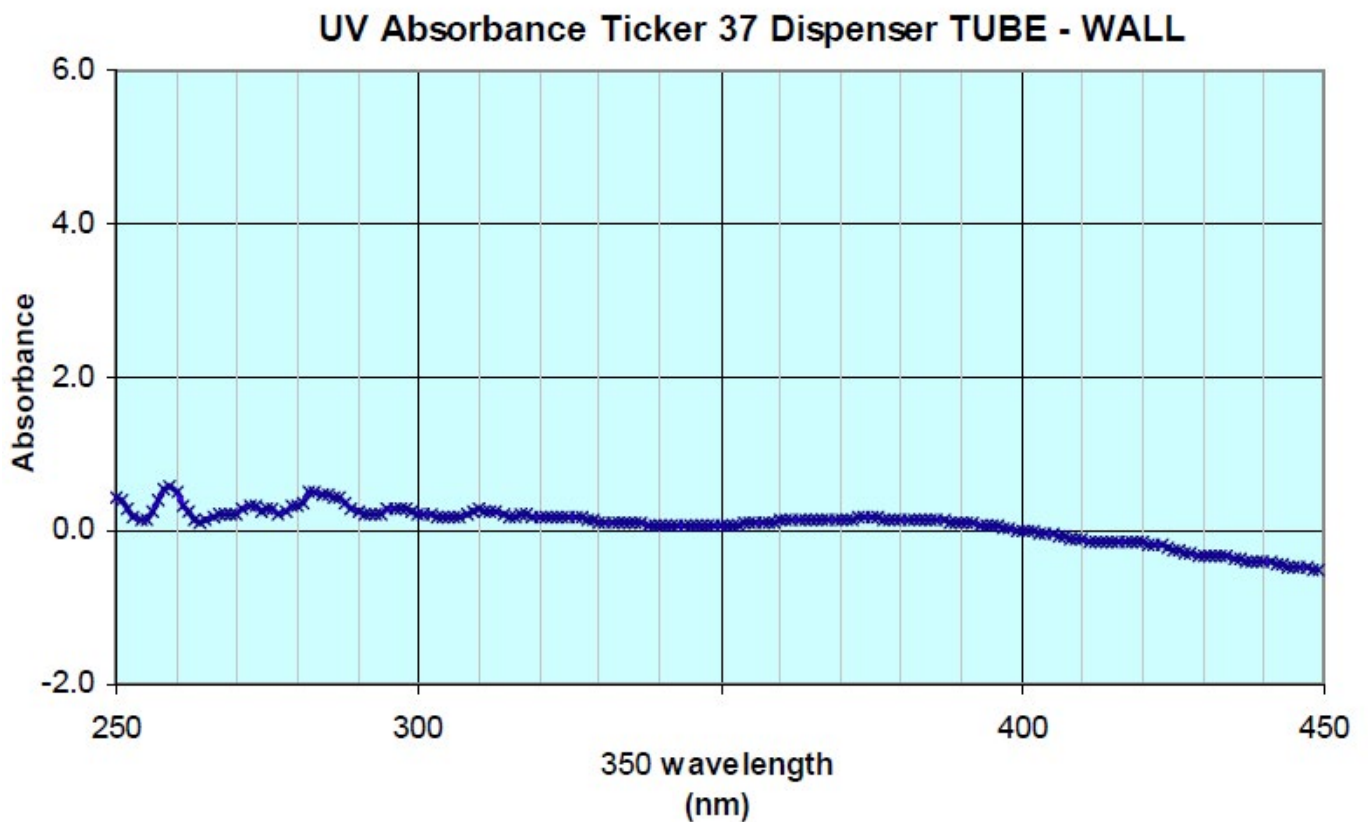Figure 9—Average UV Absorbance of Dispenser Wall

UV Absorbance Ticker 37 Dispenser TUBE - WALL

REFERENCES:

ASTM E903 specification: **"Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres"** ASTM, 100 Barr Habor Dr., West Conshohocken, PA 19428

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